

REMARKS

Claims 20, 21, and 23 to 39 are pending in the application; claim 22 is cancelled.

Rejection under 35 U.S.C. 102

Claims 20 to 39 stand rejected under 35 U.S.C. 102(b) as being anticipated by *Zeile et al.* (US 5,237,250) or *Lai et al.* (US 6,191,543).

The claims have been amended to change the term "converter" to "servo amplifier" (disclosed in the translation as filed on page 6, line2). Claim 20 as amended now defines a switching device comprising:

- at least two motors each having a feedback sensor;

- a single servo amplifier, wherein the at least two motors are connected to the single servo amplifier by a power line and a feedback line for returning feedback signals for evaluation, respectively;

- wherein the power lines and the feedback lines each have a power switch;

- a logic module connected to the single servo amplifier and configured to evaluate signals received from the single servo amplifier and configured to generate control signals;

- wherein the power switches are actuated by the control signals received from the logic module for selectively switching one of the at least two motors.

Claim 34 has been amended to define a switching device comprising:

- at least two motors;

- a single servo amplifier connected to the at least two motors;

- a multiplexer arranged downstream of the single servo amplifier;

- a decoder connected to the multiplexer for controlling the multiplexer;

- encoder lines connecting the single servo amplifier to the decoder for triggering the multiplexer;

- wherein the at least two motors each have a bidirectional driver connected by bidirectional data lines to the multiplexer;

- wherein the bidirectional drivers send signals to the at least two motors to be controlled;

- wherein the bidirectional drivers are directionally switched by signals received from the decoder.

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As discussed in the Background of the Invention section of the instant application, each motor of prior art devices is provided with its own converter (amplifier); this creates significant costs. However, many servo axes are needed only rarely or needed at different times but not simultaneously. Examples of such rarely needed servo axes are, for example, drives for machine (re)configuration used only when changing the product. In some cases, kinetics or safety aspects do not allow certain servo axes to carry out movements at the same time. A conventional servo drive is comprised of a servo converter with an output stage (power amplifier) and correlated control electronics, a motor, and various sensors as feedback for the motor control. In any case, **each motor has its own output stage or servo converter assigned thereto.**

In the switching device according to the invention, several motors are operated by a **single servo amplifier**. All motors are connected to the single servo amplifier. The logic module receives from the single servo amplifier signals for selecting one of the motors and connects accordingly all required lines of the selected motor to the corresponding interfaces of the servo amplifier (servo converter) by switching the power switches as needed.

Zeile et al. discloses a multiplexer circuit with multiplexer 54 having interfaces (Fig. 4). The motors M1 to M6 are connected to the interfaces. Control of the multiplexer circuit 54 is realized by means of computer 42, the multi-axis controller 50, and the drivers 52. This arrangement constitutes individual amplifiers for each one of the individual motors M1 to M6. Claim 1 of *Zeile et al.* specifically mentions that several amplifiers are present. The second feature of claim 1 defines a **plurality of selectively energizable stepper motor drivers** that supply energy to the associated stepper motor, respectively.

The switching device according to the invention differs from this configuration in that only a **single servo amplifier 1 or 1'** is provided for all motors M (Figs. 1 and 2) or all motors 14-1 to 14-N (Fig. 3). This already constitutes a significant difference between the invention and the cited prior art.

Zeile et al. also does not show that a logic circuit actuates power switches for selecting, based on the signals received from the servo amplifier 1, 1', the desired motor

M to be controlled.

In regard to claim 34, it should be noted that, in addition to employing a single servo converter 1, another decisive feature of claim 34 is that the multiplexer 7 is triggered by the encoder lines CLOCK 12 and DATA 3. The multiplexer 7 therefore can be triggered or controlled without additional lines being required by means of the already present encoder signals. This is also not disclosed or suggested by *Zelle et al.*

Claims 20 and 34 as amended and their dependent claims are therefore not anticipated by or obvious in view of the prior art to *Zeile et al.* Reconsideration and withdrawal of the rejection of the claims pursuant to 35 USC 102 are therefore respectfully requested.

Lai et al. disclose a circuit that also lacks important features of the invention as claimed. This prior art device also provides for each motor a **separate amplifier**. Fig. 7 shows the control of several motors 30. Col. 3, lines 60-63, disclose in this connection that six servo drivers, i.e., six servo amplifiers, and six motors 30 are operated by the arrangement.

The present invention differs from this prior art arrangement in that only a single servo amplifier 1, 1' is employed. Moreover, the prior art reference does not disclose a logic module that receives signals from the single servo amplifier and, based on the received signals, actuates power switches in order to select the desired motor to be controlled.

In regard to claim 34, it should be noted that the circuit of *Lai et al.* does not show a multiplexer. The features of amended claim 34 relating to the connections of the multiplexer to the servo amplifier and the drivers are also not disclosed in this reference.

Claims 20 and 34 as amended and their dependent claims are therefore not anticipated by or obvious in view of the cited reference to *Lai et al.* Reconsideration and withdrawal of the rejection of the claims pursuant to 35 USC are therefore respectfully requested.

CONCLUSION

In view of the foregoing, it is submitted that this application is now in condition for allowance and such allowance is respectfully solicited.

Should the Examiner have any further objections or suggestions, the undersigned

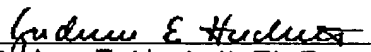
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would appreciate a phone call or e-mail from the examiner to discuss appropriate amendments to place the application into condition for allowance.

Authorization is herewith given to charge any fees or any shortages in any fees required during prosecution of this application and not paid by other means to Patent and Trademark Office deposit account 50-1199.

Respectfully submitted on March 29, 2005,


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